

Ch 5 Polynomials

5-1 Monomials

-Expression that is a number, variable, or a product of a number and one or more variables

-No variables in denominator, no variables with negative exponents, no variables under radicals

Examples of Monomials

$$\begin{array}{l} 1 \\ -2x \\ 3x^2yz^3 \end{array}$$

Not Monomials

$$\begin{array}{l} -3x+2y \\ \frac{2x}{y} \\ \sqrt{x} \end{array}$$

Exponent Laws/Rules/Properties

Negative Exponent

$$a^{-n} = \frac{1}{a^n} \text{ and } \frac{1}{a^{-n}} = a^n$$

Quotient of Powers

$$\frac{a^m}{a^n} = a^{m-n}$$

Product of Powers

$$a^m \cdot a^n = a^{m+n}$$

Properties of Powers

For a, b real numbers and m, n integers:

$$(a^m)^n = a^{mn}$$

$$(ab)^m = a^m b^m$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0$$

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n \text{ or } \frac{b^n}{a^n}, a \neq 0, b \neq 0$$

$$a^0 = 1$$

$$\frac{a^2}{a^2} = a^{2-2} = a^0 = 1$$

Degree-Sum of exponents of a monomial

(Variables Only)

Ex: $3x^2$ $\frac{1}{2}x^3$ $-5x^0$ $-8z^5$

Degree: 2 3 0 5

$$\begin{array}{l} 5x^4y^3 \\ 4 \end{array}$$

"Powers of 10"

<http://www.youtube.com/watch?v=BBsOeLcU/ARw>



works

<http://www.youtube.com/watch?v=0fKBhvDjuy0>



$$1. c^{12} \cdot c^{-4} \cdot c^6$$

$$c^{14}$$

$$2. \frac{b^8}{b^2}$$

$$b^6$$

$$3. (a^4)^5$$

$$a^{20}$$

$$4. \frac{x^{-2}y}{x^4y^{-1}}$$

$$\frac{x^{-6}y^2}{x^6}$$

$$\frac{y y^1}{x^2 x^4}$$

$$\frac{y^2}{x^6}$$

$$5. \left(\frac{a^2b^1}{a^{-3}b^2} \right)^{-1}$$

$$\left(\frac{a^5}{b} \right)^{-1}$$

$$\frac{b}{a^5}$$

$$6. \left(\frac{x^2y}{xy^3} \right)^2$$

$$\left(\frac{x}{y^2} \right)^2$$

$$\frac{x^2}{y^4}$$

$$12. \frac{2mn^2(3m^2n)^2}{12m^3n^4}$$

$$\frac{2mn^2 9m^4n^2}{12m^3n^4}$$

$$\frac{18m^5n^4}{12m^3n^4} = \frac{3m^2}{2}$$

$$7. \frac{1}{5} (-5a^2b^3)^2 (abc)^2$$

$$\frac{1}{5} 25a^4b^6 a^2b^2c^2$$

$$\boxed{5a^6b^8c^2}$$

Scientific notation | A number expressed in the form $a \times 10^n$, where $1 \leq a < 10$ and n is an integer

1. 24,300

$$2.4 \times 10^4$$

$$530\,000\,000$$

4. 525,000,000

$$5.3 \times 10^8$$

$$5.25 \times 10^8$$

2. 0.00099

$$9.9 \times 10^{-4}$$

5. 0.0000038

$$3.8 \times 10^{-6}$$

10. $(3.6 \times 10^4)(5 \times 10^3)$

$$18 \times 10^7$$

$$1.8 \times 10^8$$

13. $\frac{9.5 \times 10^7}{3.8 \times 10^{-2}}$

$$2.5 \times 10^9$$

16. $(3.2 \times 10^{-3})^2$

$$3.2^2 \times 10^{-6}$$

$$10.24 \times 10^{-6}$$

$$1.024 \times 10^{-5}$$



Polynomials

Polynomial | a monomial or a sum of monomials

$$1. (6x^2 - 3x + 2) - (4x^2 + x - 3)$$

$$2x^2 - 4x + 5$$

$$3. (-4m^2 - 6m) - (6m + 4m^2)$$

$$5. (18p^2 + 11pq - 6q^2) - (15p^2 - 3pq + 4q^2)$$

Multiplying Polynomials

FOIL Pattern	To multiply two binomials, add the products of F the <i>first</i> terms, O the <i>outer</i> terms, I the <i>inner</i> terms, and L the <i>last</i> terms.
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$$3. -5y^2(y^2 + 2y - 3)$$

$$5. (5 - 4x)(3 - 2x)$$

$$15 - 10x - 12x + 8x^2$$

$$15 - 22x + 8x^2$$

6. $(2x - 1)(3x + 5)$

$$6x^2 + 10x - 3x - 5$$
$$6x^2 + 7x - 5$$

13. $(3t^2 - 8)(t^2 + 5)$

14. $(2r + 7)^2$

$$(2r + 7)(2r + 7)$$

20. $(2n^2 - 3)(n^2 + 5n - 1)$

$$21. (x - 1)(x^2 - 3x + 4)$$

Special Cases

$$(a + b)^2$$

$$(a - b)^2$$

$$(a + b)(a - b)$$

Homework

p. 226-227 19-35odd, 41-43, 47-52

p. 231-232 16-21, 24, 27, 32, 37, 41, 47, 50